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Electrochemistry of dioxygen in lithium-air batteries¹

LAURENCE HARDWICK, University of Liverpool

The non-aqueous lithium-oxygen battery is one of a host of emerging opportunities available for enhanced energy storage [1]. Unlike a conventional battery where the reagents are contained within the cell, the lithium-oxygen cell uses dioxygen from the atmosphere to electrochemically form the discharge product lithium peroxide. Degrees of reversible oxidation and formation of lithium peroxide has been demonstrated in a number of non-aqueous electrolyte classes, mostly notably in dimethylsulfoxide based electrolytes [2], thus making the lithium-oxygen cell a potential energy storage device. This talk will present our groups recent results of the electrochemistry of dioxygen in non-aqueous electrolytes, of which particular electrolytes could have practical application within a lithium-oxygen cell. Discussion will touch upon how the electrochemistry can be related to electrode substrate and will be presented with in situ spectroscopic studies that identify intermediate and surface species during the oxygen reduction reaction.

[1] P.G. Bruce, S. Freunberger, L.J. Hardwick, J.-M. Tarascon, *Nature Mater.* (2012) 11 19

[2] Z. Peng, S.A. Freunberger, Y. Chen, P.G. Bruce, *Science*, (2012) 337 563

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